



**REPORT TO: CITY MANAGER**

**TO BE REFERRED BY THE OFFICIAL TO MAYCO VIA THE WATER AND SANITATION  
SECTION 79 COMMITTEE [AFTER CONSIDERATION BY CITY MANAGER]**

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**1. ITEM NUMBER**

**2. SUBJECT**

**FEEDBACK ON THE INTERNATIONAL TRIP UNDERTAKEN FROM 12  
June 2022 TO 19 June 2022 TO PARTICIPATE IN THE ICP-AGIR STUDY  
VISIT TO HAMBURG, GERMANY**

**ONDERWERP**

**TERUGVOERING OOR DIE INTERNASIONALE REIS ONDERNEEM VAN  
12 JUNIE 2022 TOT 19 JUNIE 2022 OM DEEL TE NEEM AAN DIE ICP-  
AGIR-STUDIEBESOEK AAN HAMBURG, DUITSLAND**

**ISIHLOKO**

**INGXELO EMALUNGA NEHAMBO KUMAZWE APHESHEYA UKUSUSELA  
KOWE<sup>12</sup> UKUYA KOWE<sup>19</sup> KWEYESILIMELA 2022 UKUTHABATHA  
INKXAXHEBA KUNDWENDWELO OLUNGESIFUNDO KWI ICP-AGIR,  
OLUSE HAMBURG, EGERMANY**

**P0005;P0084**

**3. EVENT SUMMARY**

EVENT DETAILS	
CONFERENCE/SEMINAR	N/A
OTHER	ICP – AGIR Study Tour to Hamburg, Germany
DATE	12 June 2022 to 19 June 2022
VENUE	City of Hamburg
TOTAL COST TO THE CITY	R 8 866.67
CITY	Hamburg
COUNTRY	GERMANY

ATTENDEE DETAILS	
NAME AND SURNAME	DESIGNATION
Rajan Moodley	<b>MANAGER :WASTEWATER</b>
PROVIDE SUMMARY OF HOST ORGANISATION / CITY	
<p>Hamburg Wasser Group has a mandate from the City of Hamburg to provide drinking water and disposal of sewage and assumes responsibility for this public service for the city's ~ 2 million residents. Hamburg Wasser is autonomous and fully self-financing and have 2450 employees. It is wholly owned by the Free and Hanseatic City of Hamburg. Hamburg's sewage system is the back bone of wastewater disposal with approximately 7800 kilometers of sewer network to convey waster water to the single treatment plant. The collection and conveyance system comprises sewers and retention basins with extremely large storage capacity of some 580 000 cubic meters, which enables it to handle excess runoff in case of heavy precipitation and prevent sewage from backing up of flowing over into surface waters. The total volume of Hamburg Wasser's investments in water conservation has amounted to 670 million euros over the past 25 years.</p>	

#### 4. OBJECTIVE

The International City Partnerships: Acting for Green and Inclusive Recovery (ICP-AGIR) is focused on the mitigation of the impact of climate change and means in which solid waste, energy and water, including wastewater can assist in reducing carbon dependency and to achieve carbon neutrality. The main reason for the study tour was to get familiar with systems and best practices with respect to the sectors of Waste, Energy and Wastewater and the key areas of interest in these fields are listed below:

##### **Waste Management**

- Waste / Eco Park from both a source separated stream, but especially from the mixed municipal waste pockets in Hamburg.
- Classical, robust and tested technologies for typical Mechanical or Biological Treatment solution.
- To address the Waste – Energy Nexus: working plants dealing with Refuse Derived Fuel (to possibly include torrefaction).
- Rudimentary anaerobic digestion (excluding co-digestion).

##### **Energy Transition and Security**

- Balancing between energy transition and energy security
- Hydrogen economy linkage to the decommissioning and repurposing of old power stations
- Energy efficiency and technology
- Renewable Energy integration: to explore the approach taken by Hamburg to increase RE penetration on its power system, while keeping the focus on energy security. My assumption is that Hamburg is mostly supplied by the national utility, but also has some of its own generation capacity. How do they balance RE integration, decommissioning of older plant while retaining energy security?
- Regulatory and legal hurdles of increasing generation capacity in the municipal context: what are some of the regulatory and legal hurdles faced by Hamburg in this regard, and how is the City overcoming them?
- What is the approach taken towards the long term planning of new generation (embedded/distributed) capacity, load growth and the development of the power

grid that supports this? How are these various planning activities integrated across the Hamburg power network?

What has been the approach and lessons learnt through the implementation of energy efficiency programs in the City? How was this program being balanced against the need for additional generation capacity?

### **Wastewater**

- Sludge Handling – digestion, incineration, phosphorus and nitrogen recovery
- Different type of sludge beneficiation facilities and considerations for regionalised or plant specific facilities
- Visit to the Waste Water Treatment Plant
- Treatment of CECs in sludge and effluent streams
- Waste Water Reticulation/ Reuse
- Financing, Maintenance and Management Model for the Waste Water Treatment networks and plants

Unfortunately due to Visa issues, the representatives of the City in the Waste and Energy sectors did not attend the study tour, however, Sam Smout from Green Cape and I attended all the meetings and site visits for these sectors and will provide feedback to them and share the contact details with them to engage their counterparts. The City of Hamburg will visit the City of Cape Town in October 2022 and again in February 2023 to have further engagements in these sectors.

In the Waste sector, the City is doing comparably well and could benefit in terms of incorporating a similar model for the recycling and resale of goods, furniture, bicycles, electronics and tools in a second hand stores to encourage a green economy. An area of more significant potential lies in the fermentation of household food and garden waste for the generation of gas and ultimately electricity. Unfortunately, we do not have infrastructure for gas supply and distribution however there is a demand for gas with respect to cooking and heating. Converting this gas to electricity to feed the grid is possible but there are losses of 35 to 40%.

In the Energy sector harnessing of Hydrogen and Carbon dioxide has potential, however, energy storage in times of generation and surplus has more relevance in the current South African and Cape Town context of load shedding. Naturally, moving away from conventional carbon based generation is ideal, however, it is most likely that we will still be dependent on it and only augment it with non-fossil fuel generation in the short to medium term. The City of Hamburg has the goal of becoming carbon neutral by 2035.

In the Wastewater sector, the focus was primarily on sludge treatment and disposal as this will be the City's greatest challenge in the medium term. The Wastewater Branch within the Water & Sanitation Directorate is planning to construct and operate three regional biosolids beneficiation facilities to ensure a more sustainable wastewater sludge treatment approach in future, encompassing carbon footprint reduction and circular economy principles. The first of these facilities will go to tender in 2023. Despite producing an A1a category sludge as an end product, final disposal of the high quality end product is still undecided and as per the Green Cape options analysis, disposal via land application is still recommended as the best alternative. However, due to legislative reasons and availability of land suitable for land application alternative methods of disposal are required. Several key decisions on technology and rollout need to be made during 2022 for current critical stages of the design and implementation.

This International City Partnerships: Acting for Green and Inclusive Recovery (ICP-AGIR) study tour to Hamburg covered specific topics of interest directly relevant to

the planned facilities. The City of Hamburg has only one treatment works that treats the wastewater generated from its population of 2.1 Million residents. The sludge produced at the WWTW is thickened, dewatered and dried to 42% and incinerated on site together with the screenings. Sewage sludge is not considered as a waste product but a resource. The Hamburg wastewater treatment plant uses various methods to generate heat and electricity, and it not only self-sufficient but currently produces around 22% surplus energy and intends to increase that surplus to 66%. The study tour was key in highlighting the methods used to harness the bio gas from the wastewater sludge and in its incineration and disposal of ash to landfill and more recently recovery of Phosphorous from ash as well as other useful by-products. No tertiary treatment targeted at removal of contaminants of emerging concern (CEC's) is undertaken at the wastewater treatment plant. There are also no ecoli standards for the effluent discharged, hence there are no disinfection processes. Reuse has not been considered as a potable source or to offset potable use as they have an abundant supply of subsurface water. Hamburg Wasser has a dedicated team with 5 vehicles equipped with camera surveillance and a linked active pipe jetting team to monitor and perform proactive maintenance on their reticulation network.

## **5. OUTCOMES**

The ICP-AGIR study tour to Hamburg is only one of many such tours with the large metropolitan cities in South Africa and European cities covering a wide variety of topics. This has the potential to enable better collaboration and knowledge transfer between the South African Metros. As this was only the first of a three-legged exchange between the City of Cape Town and the City of Hamburg, it will be followed up by a visit by the City of Hamburg to the City of Cape town in October 2022 and then again in February 2023 to further develop the partnership and knowledge sharing in the different sectors.

As the representative of the Waste and Energy sectors were unable to attend the tour the participant attended all the sessions, site visits and discussions relating to all three sectors and will disseminate the knowledge gained and contact details of the host's sector specialist to the City's Waste and Energy officials. The key topics and insights from the study tour are set out in Section 4 above.

## **6. ACTIONS REQUIRED**

Engage in further discussions in the respective sectors virtually and a defined programme be developed for the City of Hamburg's two visits to the City of Cape Town.

The City has to take more considerable steps towards a circular and green economy whilst trying to generate our own electricity in a more sustainable carbon free manner while moving to carbon neutrality. One of the fundamental components and means of achieving these goals is to invest and harness the potential and resources available in our sewage sludges. While energy and resource recovery from our sludges show a circular and encouraging business and environmentally sustainable model, its affordability and successful operation at full scale remains a challenge. The City of Hamburg's experience and expertise in this field will aid the City in making the most suitable choices for application in our environment.

## 7. IMPLICATIONS

- 7.1 Constitutional and Policy Implications No ☒ Yes ☐
- 7.2 Environmental implications No ☒ Yes ☐
- 7.3 Financial Implications No ☒ Yes ☐
- 7.4 Legal Implications No ☒ Yes ☐
- 7.5 Staff Implications No ☒ Yes ☐
- 7.6 Risk Implications No ☒ Yes ☐
- 7.7 POPIA Compliance

- ☒ It is confirmed that this report has been checked and considered for POPIA Compliance.

*NOTE: POPIA Section MUST be completed otherwise the report will be returned to the author for revision.*

*Contact your Directorate POPIA Stewards should you require assistance.*

**The City has a contract in place with XL Embassy Travel for the safe-keeping of Traveller's personal information as required by the POPI Act.**

## 8. RECOMMENDATIONS

It is recommended that the feedback report on the trip ICP-AGIR study visit to Hamburg, Germany undertaken by Rajan Moodley from 12<sup>th</sup> June 2022 to 19 June 2022 **be considered and noted.**

### AANBEVELINGS

Daar word aanbeveel dat kennis geneem word van die terugvoeringsverslag oor die ICP-AGIR-studiebesoek aan Hamburg, Duitsland, onderneem deur Rajan Moodley van 12 Junie 2022 tot 19 Junie 2022.

### IZINDULULO

Makuqwalaselwe ingxelo engehambo engotyelelo olungesifundo kwiICP-AGIR, eseHamburg, eGermany, eqhutywe kuRajan Moodley ukususela kowe12 ukuya kowe19 kweyeSilimela 2022.

## 9. GENERAL DISCUSSION

As the legislative requirements for the disposal of primary sludge becomes ever more stringent and with the declining availability of land for secondary sludge application, the City has to act now to ensure that wastewater sludges are sustainably disposed of and that we derive the maximum benefits available from these sludges.

The City currently produces 103 dry tons of primary sludge and 165 dry tons of secondary sludge per day. This is derived from dewatering or wasting and equivalent of 4000 m<sup>3</sup> and 26700 m<sup>3</sup> at 2.5% and 0.6% of primary and secondary sludge respectively. At this waste sludge production and if the two regionalized sludge beneficiation facilities are realized in the City, a potential electricity production of 10 MW a day and in the long term with the third regionalized facility reaching a total production around 15MW/d. If this is realized, it would imply that for one of the facilities (Northern areas) it would be completely self-sufficient and have the ability to export at least 2MW/d to the grid. At the other two potential sites at treatment works it would have the ability to provide 5 MW/d towards the plants operation thereby reducing the plants demand from the grid and reducing operational costs. It must be noted that electricity costs at one of these the plants accounts for around 20% of the R122m total operating costs per annum. Hence, biosolids beneficiation will enable significant cost reductions and potential power sale/augmentation to the grid.

Although investment in the BBF appears to be an obvious step to take in realizing a solution for sludge disposal and energy reduction or independence, undertaking these projects in isolation of the Waste and Energy sectors will not render it holistically successful nor sustainable. We have significant potential in the generation of gas to power from wastewater sludge, solid waste and individual households to reduce dependence on the national grid but would require infrastructure and the assistance of the Energy sector to enable the surplus electricity generated to be fed to the City grid. We are also in the advantageous position with respect to the black soldier fly market with well-established growers and harvesters in the City which has the potential to reduce waste and generate an array of byproducts that supports a circular economy. Green Cape are developing initiatives in this field and can provide more details if required.

## 10. ANNEXURES

### Annexure A: Programme for week 13 June 2022 to 17 June 2022

#### FOR FURTHER DETAILS, CONTACT:

DATE	18 July 2022		
NAME	Rajan Moodley	CONTACT NUMBER	084 487 2657
E-MAIL ADDRESS	Rajan.moodley@capetown.gov.za		
DIRECTORATE	Water and Sanitation	FILE REF No	WW/W02/01
SIGNATURE :			

**EXECUTIVE DIRECTOR**

MICHAEL J WEBSTER

The ED's signature represents support for report content and confirms POPIA compliance.

SIGNATURE:

NAME MICHAEL J WEBSTER

DATE

**MANAGER: INTERNATIONAL RELATIONS**

DR. DENVER VAN SCHALKWYK

SIGNATURE:

DATE

**COMMENT:**

The City of Cape Town is implementing significant investments in wastewater treatment and sludge management over the next decade (over R10 billion). These investments will all be procured by the wastewater treatment branch in the City. It is important for the city to be aware of the latest technologies and practices in wastewater treatment in order for our planning, procuring, operating and maintaining these new facilities. Hamburg Wasser is a leader in many of these technologies and has graciously agreed to partner with the city in improving our wastewater treatment services. The benefit to the manager of the wastewater treatment branch - as detailed in the report -- is a worthwhile investment for the city to make to keep us current with these latest technologies at very little cost to the city.

Actions noted.

☐ REPORT COMPLIANT WITH THE PROVISIONS OF COUNCIL'S DELEGATIONS, POLICIES, BY-LAWS AND ALL LEGISLATION RELATING TO THE MATTER UNDER CONSIDERATION.

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**LEGAL COMPLIANCE**

☐ NON-COMPLIANT

COMMENT:

NAME \_\_\_\_\_ Certified as legally compliant based on the contents of the report.

TEL \_\_\_\_\_

DATE \_\_\_\_\_

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**CITY MANAGER**

☒ NOTED

☒ REFER TO THE MAYORAL COMMITTEE VIA THE RELEVANT SECTION 79 COMMITTEE

DATE \_\_\_\_\_

COMMENT:

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